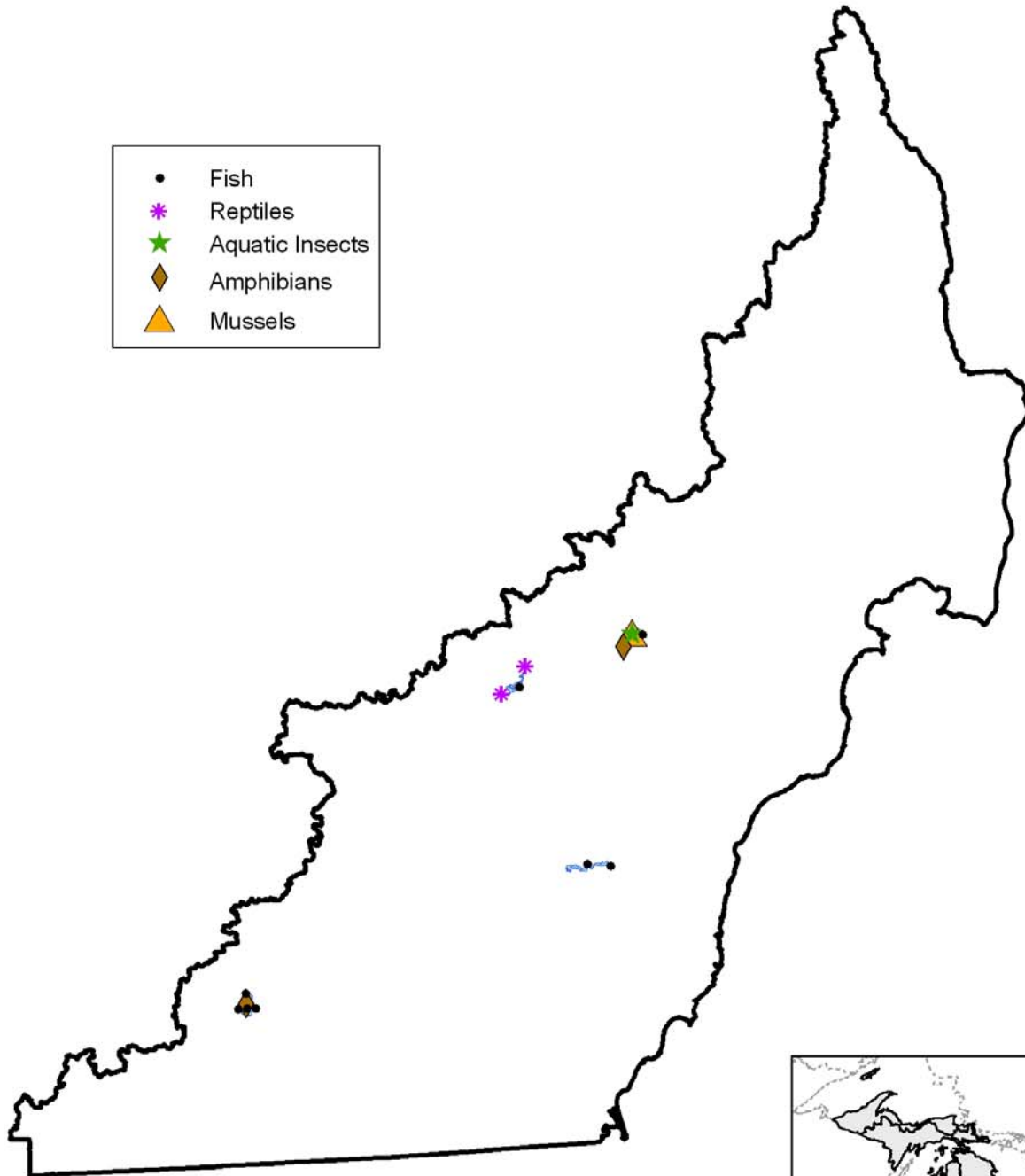
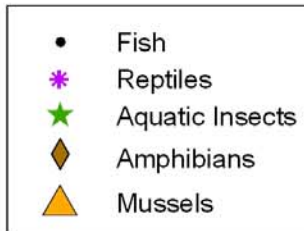


Inland Lakes: Large lakes



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Description

Large lakes are permanent standing water bodies greater than 1000 acres in area. These lakes are more homogeneous in terms of chemical and biological variables than smaller lakes, although there is still some diversity. They are typically oligotrophic to mesotrophic and most are dominated by open-water zones (pelagic) and are stratified. Large lakes are more likely to have wave-washed shores compared to smaller lakes and are unlikely to have low winter oxygen levels. There is more diversity of within-lake habitats in these lakes than smaller lakes. These lakes are the most likely to have public access points.

General Condition of Feature

This habitat is considered 40% in good to excellent condition, 20% in fair condition, and 40% in degraded to very degraded condition.

Associated Species of Greatest Conservation Need

MUSSELS

rainbow (*Villosa iris*)
pimpleback (*Quadrula pustulosa*)
eastern pondmussel (*Ligumia nasuta*)
black sandshell (*Ligumia recta*)
threehorn wartyback (*Obliquaria reflexa*)
round hickorynut (*Obovaria subrotunda*)
kidneyshell (*Ptychobranhus fasciolaris*)
fawnsfoot (*Truncilla donaciformis*)

INSECTS

elusive snaketail (*Stylurus notatus*)

FISH

pugnose minnow (*Opsopoeodus emiliae*)
black buffalo (*Ictiobus niger*)
river redhorse (*Moxostoma carinatum*)

FISH cont.

brown bullhead (*Ameiurus nebulosus*)
stonecat (*Noturus flavus*)
tadpole madtom (*Noturus gyrinus*)
brindled madtom (*Noturus miurus*)
cisco or lake herring (*Coregonus artedii*)
eastern sand darter (*Ammocrypta pellucida*)
sauger (*Sander canadensis*)

AMPHIBIANS

mudpuppy (*Necturus maculosus maculosus*)
Fowler's toad (*Bufo fowleri*)

REPTILES

Specific associations with this landscape feature were not found in the literature

Associated Threats

MODIFICATION OF NATURAL PROCESSES

- Altered hydrologic regimes: Lake level modification
- Fragmentation

POLLUTION

- Altered nutrient inflows: Surface water runoff - nutrients
- Altered sediment loads: Sedimentation
- Thermal changes
- Urban, municipal, and industrial pollution: Surface water runoff – contaminants

HABITAT CONVERSION

- Dredging and channelization: Dredging
- Riparian modification: Alteration of shoreline; Lack of woody debris

BIOLOGICAL INTERACTIONS

- Disease, pathogens, and parasites: (low threat)
- Invasive plants and animals: Zebra mussels; Gobies; Loosestrife; Milfoil

NON-CONSUMPTIVE BIOLOGICAL RESOURCE USE

- Macrophyte removal: Vegetation control through mowing or chemicals
- Non-consumptive recreation: Recreational boating - wave energy (low threat)

EDUCATION

- Social attitudes: Lack of public education to understand value of lakes and conditions needed for a healthy system.

Conservation Actions Needed (Threats addressed)

LAND, WATER & SPECIES MANAGEMENT

- Control and prevent aquatic invasive species (invasive plants and animals)
- Work with road commissions on placement and maintenance of stream crossings (altered sediment loads)
- Maintain or establish riparian buffers to at least 50 ft. (altered hydrologic regimes, altered sediment loads, riparian modification)
- Removal of exotic vegetation needs to preserve 60-80% of native vegetation (macrophyte removal, invasive plants and animals)

MICHIGAN'S WILDLIFE ACTION PLAN
AQUATIC SYSTEMS: LAKE ERIE BASIN

- Rehabilitate native flora (macrophyte removal, riparian modification)
- Use soft engineering instead of hard structures for shoreline modification (riparian modification)
- Vegetation management should only be performed in conjunction with a lake management plan (macrophyte removal)

LAW & POLICY

- Restrict beach grooming (macrophyte removal)
- Enact and enforce shoreline protection (riparian modification)
- Encourage clustered developments rather than evenly spaced home lots (riparian modification)
- Work with local officials on setback and buffer ordinances (riparian modification)
- Work with local officials to develop planning and zoning guidelines that consider natural processes (riparian modification)

EDUCATION & AWARENESS

- Educate legislators, local planning boards, and other policy makers on the importance of natural processes (social attitudes)
- Educate private landowners on the value of riparian areas (riparian modification, social attitudes)
- Educate the public on the prevention, control, and effect of aquatic invasive species (invasive plants and animals, social attitudes)
- Expand education programs for the general public regarding natural processes, invasive species, hydrologic cycles, and stewardship issues (social attitudes)

Research and Survey Needs

- Determine effective prevention, control, and survey techniques for aquatic invasive species
- Determine SGCN reptile use of large lakes
- Determine unknown life history requirements for SGCN associated with large lakes
- Determine the number and method of operation of lake-level control structures
- Determine effects of over zealous macrophyte removal on native vegetation and species communities
- Determine socially acceptable ways of maintaining natural lake inflows and outlets
- Work with watershed council and other local groups on identification skills and habitat restoration techniques

Monitoring

- Effluent discharges: waste water treatment plants, septic systems, industrial
- Indicator species
- Macrophyte removals
- Movement and introduction of aquatic invasive species
- Public attitudes and perceptions
- Riparian modification
- Water levels downstream of water-level controlled lakes to ensure that streams continue to have sufficient water
- Water levels in water-level controlled lakes to ensure they mimic natural hydrologic regimes with lakes